

**IN THE CLAIMS**

1. – 32. (canceled)

33. (new) An echo canceller that prevents echoes from occurring, comprising:

(a) a first input controller that comprises a microphone and an A/D converter, wherein the microphone supplies the input sound signal to the A/D converter and the A/D converter

converts the input sound signal into voice/noise data in digital form;

(b) a second input controller that comprises a signal receiver and a decoder, wherein the signal receiver supplies an input coded speech signal to the decoder and the decoder decodes the input coded speech signal into decoded speech data;

(c) an audio unit that comprises a D/A converter and a loudspeaker, wherein the D/A converter converts the decoded speech data into an analog speech signal and the loudspeaker outputs the analog speech signal as audible sound;

(d) a coder that encodes an echo-cancelled sound signal for transmission to a remote end;

(e) an input talkspurt detector comprising:

an input frequency spectrum calculator that calculates voice/noise frequency spectrum of the voice/noise data;

an input frequency spectrum calculator that calculates a voice/noise flatness factor indicating flatness of the voice/noise frequency spectrum and finds a maximum value of the voice/noise frequency spectrum, adds up differences between spectral components and the maximum value thereof, and generates a resulting sum of the differences as the voice/noise flatness factor; and

wherein the input sound flatness evaluator calculates an average of spectral components of the voice/noise data, normalizes the resulting sum of the differences by dividing by the calculated average, and outputs a normalized voice/noise flatness factor; an input voice/noise discriminator that determines whether the voice/noise data contains a talkspurt, by comparing the normalized voice/noise flatness factor of the voice/noise frequency spectrum with a first predetermined threshold, and sets an input sound flag to indicate presence of a talkspurt in the voice/noise data;

(f) an output talkspurt detector comprising:

an output frequency spectrum calculator that calculates speech frequency spectrum of the speech data;

an output sound flatness evaluator that calculates a speech flatness factor indicating flatness of the speech frequency spectrum and finds a maximum value of the speech frequency spectrum, adds up differences between spectral components and the maximum value thereof, and generates a resulting sum of the differences as the speech flatness factor; and

an output voice/noise discriminator that determines whether the speech data contains a talkspurt, by comparing the speech flatness factor of the speech frequency spectrum with a second predetermined threshold, and sets an output sound flag to indicate presence of a talkspurt in the speech data; and

(g) an echo canceller module comprising:

a state controller that identifies states of the voice/noise data and the speech data by monitoring the input and output sound flags, and outputs an appropriate control command which is the identified states; and

an echo cancel unit that performs a subtraction process and an echo training process depending on the control command, wherein the subtraction process produces a pseudo echo

signal by applying echo path characteristics on the speech data and outputs the echo-cancelled sound signal by subtracting the produced pseudo echo signal from the voice/noise data, and wherein the echo training process updates the echo path characteristics.

34. (new) The echo canceller according to claim 33,

- (a) wherein, when the input sound flag and the output sound flag are present, a subtract command is given as the control command;
- (b) wherein, when the input sound flag is present and the output sound is absent, both the subtract command and a train command are not given as the control command;
- (c) wherein, when the input sound flag is absent and the output sound flag is present, both the subtract command and the train command are given as the control command;
- (d) wherein, when the input sound flag and the output sound flag are absent, both the subtract command and the train command are not given as the control command;  
wherein, when the echo cancel unit receives the subtract command, the echo cancel unit produces the pseudo echo signal by applying estimated echo path characteristics to the speech data and subtracts the pseudo echo signal from the voice/noise data;  
and wherein, when the echo cancel unit receives the train command, the echo cancel unit updates the echo path characteristics with reference to the echo-cancelled sound signal, the updated echo path characteristics being used a next time the echo cancel unit produces a pseudo echo signal.